CLAIMS

What is claimed is:

1   1. A method to detect a weight-set to process a spread spectrum channel

2   comprising:

3   determining a measurement probability for a weight-set from

4   measurements of a current time-slot;

5   determining a transition probability for the weight-set, the transition

6   probability based at least on a change from a previously requested weight-set;

7   calculating a weight-set metric for the weight-set based at least on the

8   measurement and transition probabilities and a prior weight-set metric; and

9   detecting a weight-set from a group of predetermined weight-sets based at

10   least on the weight-set metric to process the current time-slot.

1   2. The method of claim 1 further comprising using the detected weight-set

2   to combine multipath components of the current time-slot.

1   3. The method of claim 1 wherein the weight-set metric is a weight-set

2   metric for a current node of a trellis of nodes, and wherein calculating the weight-

3   set metric comprises:

4   calculating, for branches of the trellis leading to the current node, a branch

5   metric based at least on the measurement and transition probabilities;

6   calculating node metrics for the current node based at least on the branch

7   metric of a branch leading to the current node and a metric of a prior node

8   connected by the branch leading to the current node; and

9   selecting a greatest of the node metrics for the current node to correspond

10   with the weight-set metric for the current node.

1   4. The method of claim 3 wherein nodes of the trellis correspond with

2   weight-sets of the group of predetermined weight-sets.

1   5. The method of claim 3 wherein the selecting comprises selecting a node

2   from a plurality of nodes having the greatest weight-set metric, each node of the

3   plurality corresponding with one weight-set of the group of predetermined weight-
4   sets.

1   6. The method of claim 1 wherein determining the measurement
2   probability includes determining the measurement probability for each weight-set
3   of the group of predetermined weight-sets based at least on received amplitude
4   and phase measurements of the current time-slot.

1   7. The method of claim 1 wherein determining the measurement
2   probability for the weight-set further comprises estimating a probability for each
3   weight-set of the group of predetermined weight-sets for the current time-slot by
4   measuring received pilot symbols of a dedicated physical channel (DPCH) and a
5   continuous pilot channel (CPICH).

1   8. The method of claim 1 wherein the group of predetermined weight-sets
2   include at least one of the weight-sets used by a base station in transmitting the
3   current time-slot in diversity mode.

1   9. The method of claim 1 wherein the transition probability is determined
2   from a probability that a weight-set was changed from other weight-sets of the
3   group of predetermined weight-sets and based at least on feedback previously
4   provided by a receiver to a transmitter.

1   10. The method of claim 9 wherein the feedback is comprised of at least
2   one feedback bit previously transmitted by a mobile unit for use by a base station
3   in transmitting the current time-slot.

1   11. The method of claim 1 further comprising determining channel taps
2   from the selected weight-set for use in combining multipath components of a
3   channel during the current time-slot.

1   12. The method of claim 1 wherein each weight of a weight-set has a
2   phase and amplitude component.

1   13. The method of claim 1 further comprising repeating the determining of

2   the measurement and transition probabilities, calculating the weight-set metric and

3   detecting a weight-set for a next time-slot, wherein the determining of the

4   transition probability uses the weight-set metrics from the current time-slot as a

5   prior time-slot.

1   14. A processor comprising:

2   a metrics calculation element to determine a measurement probability for a

3   weight-set from measurements of a current time-slot, to determine a transition

4   probability for the weight-set, the transition probability based at least on a change

5   from a previously requested weight-set, and to calculate a weight-set metric for

6   the weight-set based at least on the measurement and transition probabilities and a

7   prior weight-set metric; and

8   a weight detection element to select a weight-set from a group of

9   predetermined weight-sets based at least on the weight-set metric to process the

10   current time-slot.

1   15. The processor of claim 14 wherein the weight-set metric is a weight-

2   set metric for a current node of a trellis of nodes, and wherein the metrics

3   calculation element calculates the weight-set metric includes:

4   calculating, for branches of the trellis leading to the current node, a branch

5   metric based at least on the measurement and transition probabilities; and

6   calculating node metrics for the current node based at least on the branch

7   metric of a branch leading to the current node and a metric of a prior node

8   connected by the branch leading to the current node,

9   and the weight detection element selects a greatest of the node metrics for

10   the current node to correspond with the weight-set metric for the current node.

1   16. The processor of claim 14 wherein the metrics calculation element

2   determines the measurement probability for each weight-set of the group of

3   predetermined weight-sets based at least on received amplitude and phase

4   measurements of the current time-slot.

1   17. The processor of claim 14 wherein the metrics calculation element

2   determines the measurement probability by estimating a probability for each

3   weight-set of the group of predetermined weight-sets for the current time-slot by

4   measuring received pilot symbols of a dedicated physical channel (DPCH) and a

5   continuous pilot channel (CPICH).

1   18. The processor of claim 14 wherein the metrics calculation element

2   determines the transition probability from a probability that a weight-set was

3   changed from other weight-sets of the group of predetermined weight-sets and

4   based at least on feedback previously provided by a receiver to a transmitter.

1   19. A machine readable medium having program instructions stored

2   thereon for performing a method of processing spread spectrum channels when

3   executed within a digital processing device, the method comprising:

4   determining a measurement probability for a weight-set from

5   measurements of a current time-slot;

6   determining a transition probability for the weight-set, the transition

7   probability based at least on a change from a previously requested weight-set;

8   calculating a weight-set metric for the weight-set based at least on the

9   measurement and transition probabilities and a prior weight-set metric; and

10   detecting a weight-set from a group of predetermined weight-sets based at

11   least on the weight-set metric to process the current time-slot.

1   20. The machine readable medium of claim 19 wherein the weight-set

2   metric is a weight-set metric for a current node of a trellis of nodes, and wherein

3   calculating the weight-set metric comprises:

4   calculating, for branches of the trellis leading to the current node, a branch

5   metric based at least on the measurement and transition probabilities;

6   calculating node metrics for the current node based at least on the branch

7   metric of a branch leading to the current node and a metric of a prior node

8   connected by the branch leading to the current node; and

9   selecting a greatest of the node metrics for the current node to correspond

10   with the weight-set metric for the current node.

1   21. The machine readable medium of claim 19 wherein determining the

2 measurement probability includes determining the measurement probability for

3 each weight-set of the group of predetermined weight-sets based at least on

4 received amplitude and phase measurements of the current time-slot.

1   22. The machine readable medium of claim 19 wherein determining the

2 measurement probability for the weight-set further comprises estimating a

3 probability for each weight-set of the group of predetermined weight-sets for the

4 current time-slot by measuring received pilot symbols of a dedicated physical

5 channel (DPCH) and a continuous pilot channel (CPICH).

1   23. The machine readable medium of claim 19 wherein the transition

2 probability is determined from a probability that a weight-set was changed from

3 other weight-sets of the group of predetermined weight-sets and based at least on

4 feedback previously provided by a receiver to a transmitter.

1   24. A code division multiple access (CDMA) receiver comprising:

2   a dedicated channel measurement element to measure characteristics of

3 current time slots of a CDMA channel;

4   a metrics calculation element to calculate metrics for weight sets estimated

5 to have been used in transmitting each of the current time slots, the metrics

6 calculated from the measured characteristics of the current time slots;

7   a weight detection element to select a weight set from a group of

8 predetermined weight sets based at least on the metrics for the weight sets; and

9   a channel tap calculator to generate channel taps from the selected weight-

10 sets.

1   25. The CDMA receiver of claim 24 wherein the metrics calculation

2 element calculates metrics for weight sets based at least on a measurement

3 probability for each weight-set from measurements of one of the current time-slot,

4 and a transition probability for the weight-set, wherein the transition probability is

5 based at least on a change from a previously requested weight-set.

1   26. The CDMA receiver of claim 24 further comprising:

2   a pilot channel measurement element to measure the a channel; and

3   a weight selection element to select a channel weight set from a pilot

4 channel measurement, wherein the weight selection element provides feedback to

5 a transmitter based at least on the selected channel weight set for use in

6 subsequent transmissions to the receiver by the transmitter.

1   27. The receiver of claim 24 further comprising:

2   despreaders to despread received spread spectrum signals with spreading

3 codes; and

4   a rake receiver to weigh and combine multipath components of the

5 received spread spectrum signals using the channel taps provided by the channel

6 tap calculator.

1   28. The receiver of claim 25 wherein each weight-set metric is a weight-

2 set metric for a current node of a trellis of nodes, and wherein the metrics

3 calculation element calculates metrics for weight-set by calculating, for branches

4 of the trellis leading to the current node, a branch metric based at least on the

5 measurement and transition probabilities, and calculating node metrics for the

6 current node based at least on the branch metric of a branch leading to the current

7 node and a metric of a prior node connected by the branch leading to the current

8 node,

9   and wherein the weight detection element selects a greatest of the node

10 metrics for the current node to correspond with the weight-set metric for the

11 current node.

1   29. The receiver of claim 24 wherein the dedicated channel measurement

2 element, the metrics calculation element, the weight detection element, and the

3 channel tap calculator are functional elements of a processor.